Amendments to the Claims

The listing of claims below will replace all prior versions and listings of claims in the application:

Listing of Claims :

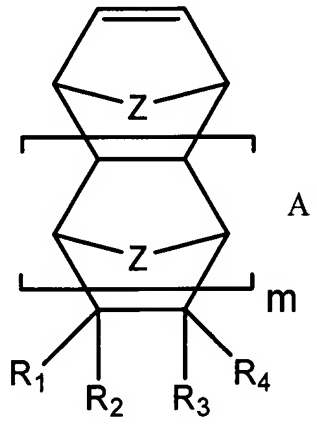
1. (Currently Amended) A photoresist composition comprising a polymer having a desired dissolution rate, said polymer comprising at least one repeat unit derived from a polycyclic olefin monomer ~~derived type of repeat unit~~ having a desired exo mole percent, where the desired exo mole percent is greater than or less than ~~the~~ an expected exo isomer mole percent for ~~a~~ the polycyclic olefin monomer from which the ~~polycyclic olefin type of~~ repeat unit is derived, such expected exo isomer mole percent based on the thermodynamic equilibrium of the isomers of such monomer that are obtained from a Diels-Alder reaction used to form such monomer.

2. (Canceled)

3. (Currently Amended) The photoresist composition of Claim 1, where the at least one repeat unit derived from a polycyclic olefin monomer ~~derived type of repeat unit~~ has an exo isomer mole percent greater than the expected exo isomer mole percent for the at least one polycyclic olefin monomer~~, such expected exo isomer mole percent based on the thermodynamic equilibrium of the isomers of such polycyclic olefin monomer that are obtained from a Diels-Alder reaction used to form such monomer~~.

4. (Currently Amended) The photoresist composition of Claim 1, where the at least one repeat unit derived from a polycyclic olefin monomer ~~derived type of repeat unit~~ has an exo isomer mole percent less than the expected exo isomer mole percent for the at least one polycyclic olefin monomer~~, such expected exo isomer mole percent based on the thermodynamic equilibrium of the isomers of such polycyclic olefin monomer that are obtained from a Diels-Alder reaction used to form such monomer~~.

5. (Currently Amended) A photoresist composition comprising a polycyclic olefin based polymer having a desired dissolution rate, said polymer comprising at least one repeat unit derived from a polycyclic olefin monomer ~~derived type of repeat unit~~ having a fluorinated carbinol pendent group as represented by Formula A:



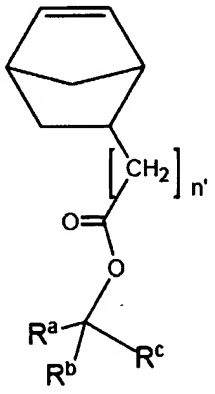
where m is an integer from 0 to 5; and Z represents -$(CH_2)p$–, where p is equal to 1 or 2; and where at least one of R_1 to R_4 is, independently, a fluorinated carbinol pendent group having from 1 to 20 carbon atoms, each carbon atom, independently, being substituted with ~~0,~~ 1, 2, or 3 fluorine atoms and where the oxygen atom is protected by a blocking or protective group that is acid cleavable; and where such at least one type of repeat unit has an exo isomer mole percent for the carbinol pendent group that is greater than or less than an ~~the~~ expected exo isomer mole percent for the ~~at least one~~ polycyclic olefin monomer, such expected exo isomer mole percent based on the thermodynamic equilibrium of the isomers of such polycyclic olefin monomer that are obtained from a Diels-Alder reaction used to form such monomer.

6. (Previously Presented) The photoresist composition of Claim 5, where the carbinol pendent group is selected from $-(CR_2)_nOR'$, $-(O-(CH_2)_n)_n-C(CF_3)_2-OR'$, $-(CH_2O)_n-C(CF_3)_2-OR'$, $-((CH_2)_nO)_n-CH_2-C(OR')(CF_3)_2$ where each occurrence of n is an independently selected integer from 0 to 5, each occurrence of R is independently hydrogen or fluorine and where R' is a group selected from dimethyl ether, methyl ethyl ether, 2-methylnorbornyl, 2-methylisobornyl, 2-methyl-2-adamantyl, tetrahydrofuranyl, tetrahydropyranoyl, 3-oxocyclohexanonyl, mevalonic lactonyl, dicyclopropylmethyl (Dcpm), dimethylcyclopropylmethyl (Dmcp) and -C(O)OR" where R" is a t-butyl, trimethylsilyl, 2-methylnorbornyl, 2-methylisobornyl, 2-methyl-2-adamantyl, tetrahydrofuranyl, tetrahydropyranoyl, 3-oxocyclohexanonyl, mevalonic lactonyl, Dcpm, or Dmcp group, or combinations thereof.

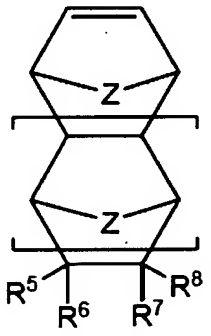
7. (Currently Amended) The photoresist composition of Claim 6, where the exo isomer ~~mol~~ mole percent for the carbinol pendent group containing repeat units is greater than the expected exo isomer mole percent for the ~~at least one~~ polycyclic olefin monomer from which it is derived.

8. (Currently Amended) The photoresist composition of Claim ~~5~~ 6, where the exo isomer mole percent for the carbinol pendent group containing repeat units is ~~greater~~ less than the expected exo isomer mole percent for the ~~at least one~~ polycyclic olefin monomer from which it is derived.

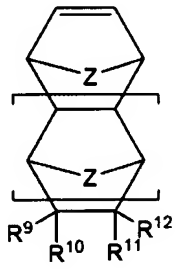
9. (Currently Amended) The photoresist composition of Claim 8, where the ~~a~~ polycyclic olefin based polymer further comprises repeat units derived from polycyclic olefins monomers represented by one or more of Formulae A2, B and C:



Formula A2



Formula B



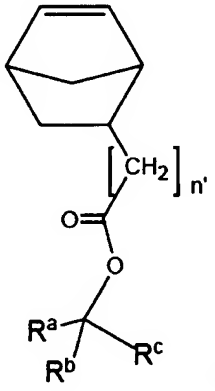
Formula C

where for Formula A2, n' is an integer from 0 to 5 and R^a, R^b, and R^c, independently, represent linear or branched C_1 to C_{20} hydrocarbyl groups or R^a and R^b taken together along with the common carbon to which they are attached represent a saturated cyclic group containing 4 to 12 carbon atoms; and where for Formula B, m and Z are ~~a~~ as previously defined and each of R^5, R^6, R^7 and R^8, independently, are H, a fluorine, a linear, branched or cyclic C_1 to C_{30} alkyl, alkylol, aryl, aralkyl, alkaryl, alkenyl or alkynyl; with the proviso that at least one of R^5, R^6, R^7 and R^8 is a functional group that is capable of crosslinking and where for Formula C, m and Z are ~~a~~ as previously defined and each of R^9, R^{10}, R^{11} and R^{12}, are each an independently selected neutral substituent selected from the group of substituents consisting of fluorines, $-(CH_2)_n-C(O)OR^{21}$, $-(CH_2)_n-(CM_2)_n-OR^{18}$, $-(CM_2)_n-OC(O)R^{17}$,

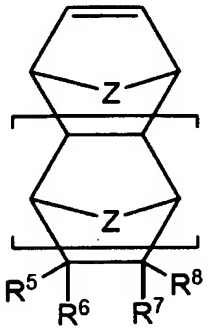
$-(CH_2)_n-OC(O)OR^{17}$, $-(CH_2)_n-C(O)R^{18}$, $-(CH_2)_nC(R^{19})_2CH(R^{19})(C(O)OR^{20})$, $-(CH_2)_n-NH-(SO_2)-CF_3$, $-(CH_2)_nC(R^{19})_2CH(C(O)OR^{20})_2$, $-C(O)O-(CH_2)_n-OR^{18}$, ~~and~~ $-(CH_2)_n-O-(CH_2)_n-OR^{18}$, and $-(CH_2)_n-(O-(CH_2)_n)_n-C(CF_3)_2OR^{21}$ where each occurrence of n is independently an integer from 0 to 5, M can be hydrogen or fluorine, R^{19} can independently be hydrogen, fluorine, a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group or a linear or branched C_1 to C_{10} fluorinated alkyl cycloalkyl group, R^{18} can independently be hydrogen, a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group or a linear or branched C_1 to C_{10} fluorinated alkyl or cycloalkyl group, R^{20} is not readily cleavable by an acid from a photoacid generator and can independently be a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group, or a linear or branched C_1 to C_{10} fluorinated alkyl or cycloalkyl group, R^{17} is not readily cleavable by a photoacid generator and can independently be linear or branched C_1 to C_{10} alkyls or fluorinated alkyls, a monocyclic or polycyclic C_4 to C_{20} cycloaliphatic or fluorinated cycloalkyl moiety, a cyclic ether, a cyclic ketone or a cyclic ester (lactone), where each of the cyclic ether, ketone and ester can be fluorinated or not and R^{21} is defined as R^{17} plus hydrogen.

10. (Currently Amended) The photoresist composition of Claim 5, where the exo isomer mole percent for the carbinol pendent group is less than the expected exo isomer mole percent for the ~~at least one~~ polycyclic olefin monomer.

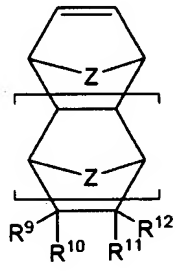
11. (Currently Amended) The photoresist composition of Claim 10, where the ~~a~~ polycyclic olefin based polymer further comprises repeat units derived from polycyclic olefins monomers represented by one or more of Formulae A2, B and C:



Formula A2



Formula B



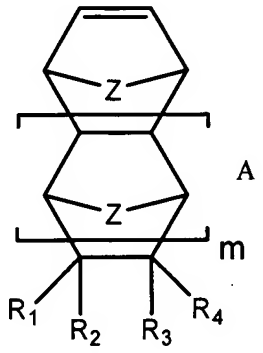
Formula C

where for Formula A2, n' is an integer from 0 to 5 and R^a, R^b, and R^c, independently, represent linear or branched C_1 to C_{20} hydrocarbyl groups or R^a and R^b taken together along with the common carbon to which they are attached represent a saturated cyclic group containing 4 to 12 carbon atoms; and where for Formula B, m and Z are ~~a~~ as previously defined and each of R^5, R^6, R^7 and R^8, independently, are H, a fluorine, a linear, branched or cyclic C_1 to C_{30} alkyl, alkylol, aryl, aralkyl, alkaryl, alkenyl or alkynyl; with the proviso that at least one of R^5, R^6, R^7 and R^8 is a functional group that is capable of crosslinking and where for Formula C, m and Z are ~~a~~ as previously defined and each of R^9, R^{10}, R^{11} and R^{12}, are each an independently selected neutral substituent selected from the group of substituents consisting of fluorines, $-(CH_2)_n-C(O)OR^{21}$, $-(CH_2)_n-(CM_2)_n-OR^{18}$, $-(CM_2)_n-OC(O)R^{17}$,

$-(CH_2)_n-OC(O)OR^{17}$, $-(CH_2)_n-C(O)R^{18}$, $-(CH_2)_nC(R^{19})_2CH(R^{19})(C(O)OR^{20})$, $-(CH_2)_n-NH-(SO_2)-CF_3$, $-(CH_2)_nC(R^{19})_2CH(C(O)OR^{20})_2$, $-C(O)O-(CH_2)_n-OR^{18}$, ~~and~~ $-(CH_2)_n-O-(CH_2)_n-OR^{18}$, and $-(CH_2)_n-(O-(CH_2)_n)_n-C(CF_3)_2OR^{21}$ where each occurrence of n is independently an integer from 0 to 5, M can be hydrogen or fluorine, R^{19} can independently be hydrogen, fluorine, a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group or a linear or branched C_1 to C_{10} fluorinated alkyl cycloalkyl group, R^{18} can independently be hydrogen, a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group or a linear or branched C_1 to C_{10} fluorinated alkyl or cycloalkyl group, R^{20} is not readily cleavable by an acid from a photoacid generator and can independently be a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group, or a linear or branched C_1 to C_{10} fluorinated alkyl or cycloalkyl group, R^{17} is not readily cleavable by a photoacid generator and can independently be linear or branched C_1 to C_{10} alkyls or fluorinated alkyls, a monocyclic or polycyclic C_4 to C_{20} cycloaliphatic or fluorinated cycloalkyl moiety, a cyclic ether, a cyclic ketone or a cyclic ester (lactone), where each of the cyclic ether, ketone and ester can be fluorinated or not and R^{21} is defined as R^{17} plus hydrogen.

12. (Currently Amended) A method for forming ~~controlling the differential dissolution rate of~~ a photoresist composition having a desired dissolution rate comprising:

determining a ~~desired~~ first exo mole percent of a polycyclic olefin monomer ~~derived type of repeat unit~~ having a fluorinated carbinol pendent group as represented by Formula A:



A

where m is an integer from 0 to 5; and Z represents $-(CH_2)_p-$, where p is equal to 1 or 2; and where at least one of R_1 to R_4 is, independently, a fluorinated carbinol pendent group having from 1 to 20 carbon atoms, each carbon atom, independently, being substituted with ~~0,~~ 1, 2, or 3 fluorine atoms and where the oxygen atom is protected by a blocking or protective group that is acid cleavable;

forming a first polymer comprising repeating units derived from said polycyclic olefin monomer;

determining a first dissolution rate of said polymer;

modifying the first exo mole percent of said polycyclic olefin monomer to a second exo mole percent greater than or less than the first exo mole percent;

forming a second polymer comprising repeating units derived from the polycyclic olefin monomer having the second exo mole percent; and

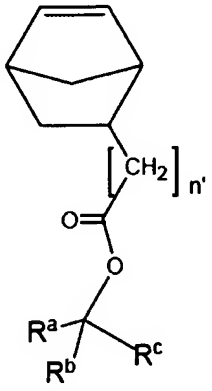
formulating the photoresist composition, such composition comprising the second ~~polymer that comprises a polycyclic olefin derived resin where such resin comprises at least one repeating unit~~

~~derived from such polycyclic olefin having a fluorinated carbinol pendent group~~.

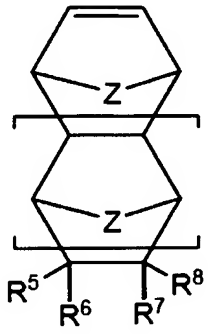
13. (Previously Presented) The method of Claim 12, where the fluorinated carbinol pendent group of the at least one repeating unit is selected from -$(CR_2)_nOR'$, -$(O\text{-}(CH_2)_n)_n\text{-}C(CF_3)_2\text{-}OR'$, -$(CH_2O)_n\text{-}C(CF_3)_2\text{-}OR'$, -$((CH_2)_nO)_n\text{-}CH_2\text{-}C(OR')(CF_3)_2$ where each occurrence of n is an independently selected integer from 0 to 5, each occurrence of R is independently hydrogen or fluorine and where R' is a group selected from dimethyl ether, methyl ethyl ether, 2-methylnorbornyl, 2-methylisobornyl, 2-methyl-2-adamantyl, tetrahydrofuranyl, tetrahydropyranoyl, 3-oxocyclohexanonyl, mevalonic lactonyl, dicyclopropylmethyl (Dcpm), dimethylcyclopropylmethyl (Dmcp) and -C(O)OR" where R" is a *t*-butyl, trimethylsilyl, 2-methylnorbornyl, 2-methylisobornyl, 2-methyl-2-adamantyl, tetrahydrofuranyl, tetrahydropyranoyl, 3-oxocyclohexanonyl, mevalonic lactonyl, Dcpm, or Dmcp group, or combinations thereof.

14. (Currently Amended) The method of Claim 13, where the <u>second</u> ~~desired~~ exo mole percent for the carbinol pendent group is greater than the expected exo isomer mole percent for the ~~at least one~~ polycyclic olefin monomer.

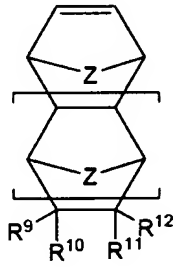
15. (Currently Amended) The method of Claim 14 where the ~~a~~ polycyclic olefin based polymer further comprises repeat units derived from polycyclic olefins monomers represented by one or more of Formulae A2, B and C:



Formula A2



Formula B



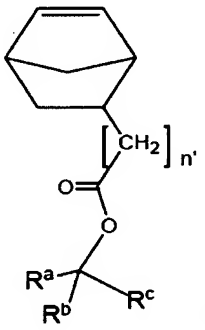
Formula C

where for Formula A2, n' is an integer from 0 to 5 and R^a, R^b, and R^c, independently, represent linear or branched C_1 to C_{20} hydrocarbyl groups or R^a and R^b taken together along with the common carbon to which they are attached represent a saturated cyclic group containing 4 to 12 carbon atoms; and where for Formula B, m and Z are ~~a~~ as previously defined and each of R^5, R^6, R^7 and R^8, independently, are H, a fluorine, a linear, branched or cyclic C_1 to C_{30} alkyl, alkylol, aryl, aralkyl, alkaryl, alkenyl or alkynyl; with the proviso that at least one of R^5, R^6, R^7 and R^8 is a functional group that is capable of crosslinking and where for Formula C, m and Z are ~~a~~ as previously defined and each of R^9, R^{10}, R^{11} and R^{12}, are each an independently selected neutral substituent selected from the group of substituents consisting of fluorines, $-(CH_2)_n-C(O)OR^{21}$, $-(CH_2)_n-(CM_2)_n-OR^{18}$, $-(CM_2)_n-OC(O)R^{17}$, $-(CH_2)_n-OC(O)OR^{17}$, $-(CH_2)_n-C(O)R^{18}$, $-(CH_2)_nC(R^{19})_2CH(R^{19})(C(O)OR^{20})$,

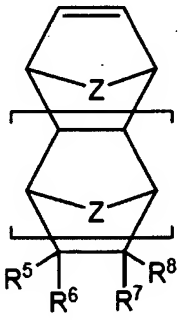
$-(CH_2)_n-NH-(SO_2)-CF_3$, $-(CH_2)_nC(R^{19})_2CH(C(O)OR^{20})_2$, $-C(O)O-(CH_2)_n-OR^{18}$, ~~and~~ $-(CH_2)_n-O-(CH_2)_n-OR^{18}$, and $-(CH_2)_n-(O-(CH_2)_n)_n-C(CF_3)_2OR^{21}$ where each occurrence of n is independently an integer from 0 to 5, M can be hydrogen or fluorine, R^{19} can independently be hydrogen, fluorine, a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group or a linear or branched C_1 to C_{10} fluorinated alkyl cycloalkyl group, R^{18} can independently be hydrogen, a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group or a linear or branched C_1 to C_{10} fluorinated alkyl or cycloalkyl group, R^{20} is not readily cleavable by an acid from a photoacid generator and can independently be a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group, or a linear or branched C_1 to C_{10} fluorinated alkyl or cycloalkyl group, R^{17} is not readily cleavable by a photoacid generator and can independently be linear or branched C_1 to C_{10} alkyls or fluorinated alkyls, a monocyclic or polycyclic C_4 to C_{20} cycloaliphatic or fluorinated cycloalkyl moiety, a cyclic ether, a cyclic ketone or a cyclic ester (lactone), where each of the cyclic ether, ketone and ester can be fluorinated or not and R^{21} is defined as R^{17} plus hydrogen.

16. (Currently Amended) The method of Claim 13, where the second ~~desired~~ exo mole percent for the carbinol pendent group is greater than the expected exo isomer mole percent for the ~~at least one~~ polycyclic olefin monomer.

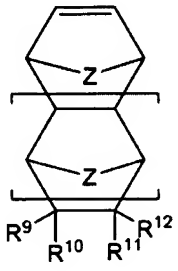
17. (Currently Amended) The method of Claim 16 the ~~a~~ polycyclic olefin based polymer further comprises repeat units derived from polycyclic olefins monomers represented by one or more of Formulae A2, B and C:



Formula A2



Formula B



Formula C

where for Formula A2, n' is an integer from 0 to 5 and R^a, R^b, and R^c, independently, represent linear or branched C_1 to C_{20} hydrocarbyl groups or R^a and R^b taken together along with the common carbon to which they are attached represent a saturated cyclic group containing 4 to 12 carbon atoms; and where for Formula B, m and Z are ~~a~~ as previously defined and each of R^5, R^6, R^7 and R^8, independently, are H, a fluorine, a linear, branched or cyclic C_1 to C_{30} alkyl, alkylol, aryl, aralkyl, alkaryl, alkenyl or alkynyl; with the proviso that at least one of R^5, R^6, R^7 and R^8 is a functional group that is capable of crosslinking and where for Formula C, m and Z are ~~a~~ as previously defined and each of R^9, R^{10}, R^{11} and R^{12}, are each an independently selected neutral substituent selected from the group of substituents consisting of fluorines, $-(CH_2)_n-C(O)OR^{21}$, $-(CH_2)_n-(CM_2)_n-OR^{18}$, $-(CM_2)_n-OC(O)R^{17}$, $-(CH_2)_n-OC(O)OR^{17}$, $-(CH_2)_n-C(O)R^{18}$, $-(CH_2)_nC(R^{19})_2CH(R^{19})(C(O)OR^{20})$, $-(CH_2)_n-NH-(SO_2)-CF_3$, $-(CH_2)_nC(R^{19})_2CH(C(O)OR^{20})_2$, $-C(O)O-(CH_2)_n-OR^{18}$, ~~and~~ $-(CH_2)_n-O-(CH_2)_n-OR^{18}$, and $-(CH_2)_n-(O-(CH_2)_n)_n-C(CF_3)_2OR^{21}$ where each

occurrence of n is independently an integer from 0 to 5, M can be hydrogen or fluorine, R^{19} can independently be hydrogen, fluorine, a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group or a linear or branched C_1 to C_{10} fluorinated alkyl cycloalkyl group, R^{18} can independently be hydrogen, a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group or a linear or branched C_1 to C_{10} fluorinated alkyl or cycloalkyl group, R^{20} is not readily cleavable by an acid from a photoacid generator and can independently be a linear or branched C_1 to C_{10} alkyl group or cycloalkyl group, or a linear or branched C_1 to C_{10} fluorinated alkyl or cycloalkyl group, R^{17} is not readily cleavable by a photoacid generator and can independently be linear or branched C_1 to C_{10} alkyls or fluorinated alkyls, a monocyclic or polycyclic C_4 to C_{20} cycloaliphatic or fluorinated cycloalkyl moiety, a cyclic ether, a cyclic ketone or a cyclic ester (lactone), where each of the cyclic ether, ketone and ester can be fluorinated or not and R^{21} is defined as R^{17} plus hydrogen.